

# COUNTY BOARD FACTSHEET

# FILED

TO : County Clerk  
ATTENTION : Susan Starcher  
FROM : Marvin S. Krout, Director of Planning  
RE : **Comprehensive Plan Amendment No. 08001**  
(Wastewater Facilities Master Plan)  
DATE : March 6, 2008

MAR 6 2008

LANC. COUNTY CLERK

1. Attached is the Planning staff report (p.2-5), the minutes of the Planning Commission (p.6-9) and all other additional information submitted on **Comprehensive Plan Amendment No. 08001**, requested by the Director of the Public Works & Utilities Department to amend the 2030 Lincoln-Lancaster County Comprehensive Plan to adopt the proposed **Wastewater Facilities Master Plan**. This plan provides the City of Lincoln with a guide for short-term and long-term improvements to the infrastructure of the Lincoln wastewater collection and treatment facilities required over the next 20 years and into the longer term. The Facilities Master Plan was developed in conjunction with the Tiers map in the 2030 Comprehensive Plan. The information contained in this plan is to be used for general planning, identifying capital improvement projects and determining funding requirements.
2. The Master Plan document has previously been provided to the County Commissioners on CD and is also available at [www.lincoln.ne.gov](http://www.lincoln.ne.gov) (keyword = *wastewater master plan*). The amendment proposed by staff on February 27, 2008, set forth below, will be incorporated into the Master Plan document upon approval by the City Council and County Board.
3. The staff recommendation to approve this Comprehensive Plan Amendment is based upon the "Analysis" as set forth on p.2-4, concluding that the proposed Wastewater Facilities Master Plan is in conformance with the 2030 Lincoln-Lancaster County Comprehensive Plan. Overall, the Master Plan identifies approximately \$374 million in improvement costs in order to serve Tier I development by the year 2030. In the near term, the City has programmed sanitary sewer rate increases in each of the next several years in order to maintain the funding necessary to build the improvements. In addition, rate increases will provide funding for needed operation and maintenance costs. The staff presentation is found on p.6-7. The following amendment was proposed by staff at the public hearing before the Planning Commission:

For the purposes of planning, a cost of \$416,000.00 from Alternative 4 was included in the Tier III Theresa Street WWTF improvement. Alternative 4, "Increased Storage" is the preferred alternative and is the basis for all improvements and calculations of the Wastewater Master Plan. The costs for this alternative are spread over a 20 year period starting in the year 2055.

The additional information submitted by staff is found on p.11-14.

4. Testimony in opposition is found on p.7-8, and the record consists of letters in opposition from the Friends of Wilderness Park and attorney Lynn Mooror (p.15-26). The main issue of the opposition is that the Plan does not include a cost-benefit analysis.
5. On February 27, 2008, the Planning Commission agreed with the staff recommendation and voted 7-0 to recommend approval, as amended by staff on 2/27/08 (Larson and Moline absent). See Minutes, p.8-9.
6. The public hearing before the City Council is scheduled for Monday, March 17, 2008, at 1:30 p.m.

Please take the necessary steps to schedule this item on the County Board agenda for public hearing on **Tuesday, March 25, 2008, at 9:30 a.m.** A briefing on this proposal was held at the County Board staff meeting on February 14, 2008. If you need any further information, please let me know (441-6365).

cc: County Board  
County Attorney  
County Engineer  
Kerry Eagan, County Commissioners  
Greg MacLean, Public Works & Utilities  
Steve Masters, Public Works & Utilities  
Gary Brandt, Public Works & Utilities

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**LINCOLN /LANCASTER COUNTY PLANNING STAFF REPORT**  
**for February 27, 2008 Planning Commission Meeting**

**P.A.S.:** Comprehensive Plan Amendment #08001

**PROPOSAL:** Amend the 2030 Lincoln/ Lancaster County Comprehensive Plan to adopt the Wastewater Facilities Master Plan.

**CONCLUSION:** The proposed Wastewater Facilities Master Plan is in conformance with the 2030 Lincoln-Lancaster County Comprehensive Plan

<b><u>RECOMMENDATION:</u></b>	Approval of the proposed amendment
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**GENERAL INFORMATION:**

**HISTORY:** The previous Wastewater Master Plan was adopted as Comprehensive Plan Amendment #03003 in 2003 as part of the 2025 Comprehensive Plan and was retained with the adoption of the 2030 Comprehensive Plan in November 2006.

**COMPREHENSIVE PLAN SPECIFICATIONS:** The 2030 Comprehensive Plan states:

Page 75      ***Wastewater Guiding Principles:***  
*Utility improvements shall be in accordance with the Lincoln Wastewater Facilities Plan and the Comprehensive Plan. The Lincoln Wastewater Facilities Plan will guide future actions and serve as the basis for facilities planning and improvements.*

Page 78      *The Public Works and Utilities Department has completed the Lincoln Wastewater Facilities Plan. The plan is a guide for short term and long term improvements to the infrastructure of the Lincoln Wastewater System during the planning period, as well as potential service extensions beyond Lincoln's anticipated future service limits.*

**ANALYSIS:**

1. Since the adoption of the Lincoln-Lancaster County 2030 Comprehensive Plan in November 2006, the City's Public Works and Utilities Department have worked on the updated Lincoln Wastewater Facilities Master Plan. This plan provides the City of Lincoln with a guide for short-term and long-term improvements to the infrastructure of the Lincoln wastewater collection and treatment facilities required over the next 20 years and into the longer term. The Facilities Plan was developed in conjunction with the tiers map from the 2030 Comprehensive Plan. The information contained in this plan is to be used for general planning, identifying capital improvement projects, and determining funding requirements.

2. The plan's recommended improvements encompass both the collection system and the two existing treatment facilities.

**Collection System:** The Facilities Plan recommends a number of improvements to the existing wastewater collection system. Improvements to the existing wastewater system and to accommodate anticipated growth are estimated to cost \$202 million to serve the Tier I area indicated as in the 2030 Comprehensive Plan. Improvements in specific drainage basins are identified for the collection system in the following chapters:

- |                            |   |
|----------------------------|---|
| (10) Salt Creek            | (17) Oak Creek & Lynn Creek             |
| (11) Antelope Creek        | (18) Little Salt Creek;                 |
| (12) Beals Slough          | (19) Dead Mans Run, E. Campus, Havelock |
| (13) Upper SE Salt Creek   | (20) Northeast Salt Creek               |
| (14) Upper SW Salt Creek   | (21) Stevens Creek;                     |
| (15) Haines Branch         | (22) Southeast Basin                    |
| (16) Middle Creek & West O |   |

The improvements involve extensions of existing trunk lines and projects that address immediate and long term additional capacity on existing pipelines by constructing relief sewers. The timing of construction will be coordinated with that future development in the Lincoln service area and may vary from initial time lines identified in the master plan.

3. The Master Plan also emphasizes the use of storage to handle peak flows as a way to handle areas where the collection pipes would be over capacity during a peak flow (storm) event. This increased the effective capacity by allowing them to transport more effluent in the same size pipe, by extending the amount of time the effluent is conveyed in the pipe. The Master Plan also used a new dynamic model to evaluate the collection system. This modeling more realistically portrayed how effluent moves through the system which resulted in the capacity of the pipes was determined to be greater in many circumstances.
4. **Treatment Facilities:** The Facilities Plan recommends improvements for both the Theresa Street and Northeast Wastewater Treatment Facilities, but does not identify a need for a third wastewater treatment facility within the Tier I or Tier II planning period. The capital improvements laid out in the plan reflect changes needed for both the additional amounts of effluent and required treatment of wastewater. The Facilities Plan calls for additional expansion and treatment improvements for Theresa Street at an approximate cost of \$133 million and \$38 million for the Northeast Treatment Facility.
5. A public meeting was held on January 29<sup>th</sup> to present the findings of the Master Plan and provide an opportunity for questions and comments. The Planning Commission received a briefing on January 30<sup>th</sup>.

6. One item of particular interest was the Master Plan's analysis of four alternatives for handling collection of wastewater in the southwest area of Lincoln for Tier III development (potentially 50+ years from now). The Master Plan in Chapter 24, starting on page 24-6 examines the following four long term options:
  - a Southwest treatment plant
  - new pipeline along the west side of Salt Creek
  - new pipeline on east side, near two existing sewer lines, adjacent to Wilderness Park, and
  - a new option, adding more peak storage
7. The Wastewater Master Plan recommends additional peak storage as the preferred alternative. The analysis found that peak storage was the least costly and was probably the least difficult to construct and permit. Staff also noted that adding storage would have the least potential for any impact on Wilderness Park of the four alternatives. As stated in a February 7<sup>th</sup> letter to the Planning Commission. "The storage facility would hold peak flows to be later released into the trunk sewer lines. Wastewater conveyed through the trunk sewers from Southwest Lincoln will be treated at the Theresa Street Wastewater Treatment Facility."
8. Staff noted that there is significant benefit in not disturbing park land and developed land. "Both alternatives involving new trunk line construction would involve significant costs and time involved to design, obtain right-of-way and build pipeline projects. Given the recommended alternative, and the fact that the need for this alternative is potentially 50 years away, it is felt that the additional detailed study is not necessary. The storage alternative manages peak flows with the least adverse impact of the four options effecting both the natural and built environment."
9. Developing the storage facilities to serve future growth will require the city to purchase land for the facilities in the near term. This will secure the land in advance of future development and so that adjoining land uses will know of the potential sanitary sewage storage facility prior to their development.

#### **SUMMARY:**

The basic elements of the Lincoln Wastewater System are identified on page 78 and on Appendix pages A39 and A39 of the 2030 Comprehensive Plan. These sections describe the existing wastewater collection and treatment system and outlines future improvements that were projected to meet future needs of community growth. It is important to note, however, that while the description of the future wastewater system is limited to this section, the system's impact on the Plan extends well beyond these pages. The present and future location and scope of the wastewater system is an integral part of the growth plan and its implementation.

Overall, the Master Plan identifies approximately \$374 million in improvement costs in order to serve Tier I development by the year 2030. In the near term, the City

has programmed sanitary sewer rate increases in each of the next several years in order to maintain the funding necessary to build the improvements. In addition, rate increases will provide funding for needed operation and maintenance costs.

**PROPOSED AMENDMENTS:**

Amend the 2030 Lincoln-Lancaster County Comprehensive Plan as follows:

1. Update the City of Lincoln Wastewater Improvements map on page 78 to reflect the updated Tier I improvements from Figure 1.4, Chapter 1, "Executive Summary" of the Wastewater Facilities Master Plan on page 1-11.
2. Amend the following text on page 155, Future Conditions - Plan Realization, "Subarea Planning"

- Lincoln Wastewater Facilities Master Plan, Public Works and Utilities Department; ~~March 2003~~ November 2007.

Prepared by:

Stephen Henrichsen  
441-6374  
Principal Planner  
[shenrichsen@lincoln.ne.gov](mailto:shenrichsen@lincoln.ne.gov)

February 14, 2008

**APPLICANT:**

Marvin Krout, Director  
Planning Department  
555 S. 10<sup>th</sup> Street  
Lincoln, NE 68508  
(402) 441-7491

at request of

Greg MacLean, Director  
Public Works & Utilities Dept.  
555 S. 10<sup>th</sup> Street  
Lincoln, NE 68508  
(402) 441- 7548

**CONTACT :**

Steve Masters, Public Utilities Administrator  
Public Works & Utilities Dept.  
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Lincoln, NE 68508  
(402) 441- 7588

# COMPREHENSIVE PLAN AMENDMENT NO. 08001

## PUBLIC HEARING BEFORE PLANNING COMMISSION:

February 27, 2008

Members present: Gaylor-Baird, Carroll, Cornelius, Esseks, Francis, Sunderman and Taylor; Larson and Moline absent.

Staff recommendation: Approval

Ex Parte Communications: None

Staff presentation: **Steve Henrichsen of Planning staff** stated that Planning generally reviews these applications for conformance with the Comprehensive Plan. These master plans provide a lot of technical information. This is a big picture of over 200 square miles of future growth area. This looks at Tier I, Tier II and Tier III Growth Areas. This takes into account a lot of the environmental and economical factors. Later this year, we anticipate to have the Water Master Plan in front of Planning Commission. This updates the current reference to the new Wastewater Master Plan as an approved component of the Watershed Master Plan. There was a specific question for an alternative southwest treatment plant. It notes that out of four different alternatives, the preferred alternative was increasing the storage capacity, not for the treatment plant. The proposed language states that alternative storage is the preferred alternative.

Staff offers the clarifying amendment for page 1-20 of the Executive Summary, page 24-17 "Wastewater Treatment Facilities Future Improvements" and other appropriate locations:

~~For the purposes of planning, a cost of \$416,000.00 from Alternative 4 was included in the Tier III Theresa Street WWTF improvement. Alternative 4, "Increased Storage" is the preferred alternative and is the basis for all improvements and calculations of the Wastewater Master Plan. The costs for this alternative are spread over a 20 year period starting in the year 2055.~~

## Proponents

1. **Steve Masters of Public Works** stated that the Lincoln Wastewater System serves the Lincoln community. They need to be mindful of environmental quality. They make use of the tiered growth areas. Detailed information is provided about pipe capacity in the plan. Corolla Engineers began work on the facilities study in 2006. There is a change in the modeling technology that was used. This was a concept that was not used in 2003. It also includes an alternative peak flow storage. As the pipes fill during extreme rain events, off truck storage water could be held until flows recede. This is a concept that has not been included in previous facilities plans. Continued flow monitoring, continued inflow and infiltration reduction are all utilized. The facilities study places emphasis on maintenance.

They met last year with the Chamber of Commerce, the Planning Commission, County Board, County Ecological Committee, Home Builders Association of Lincoln, and posted the study on the city website and with the library. He sees the facilities as vital to the public health.

Esseks likes the amendment stating increased storage is the preferred alternative. He asked Masters to elaborate how this will guide future planning. Masters replied that the other alternatives are construction of parallel trunk sewers. They will not be looking at cost of easement and right-of-way. The other alternative that is not included is additional treatment. Much less land area for storage is required than for additional treatment. We will not be acquiring land for a treatment facility but for storage.

Gaylor-Baird inquired about funding. Henrichsen stated that utility rates is how the improvements are paid for. Impact fees are also part of the program. In the past there have been funds for projects. Public Works will be looking at all venues to fund this.

Esseks asked if this will be above ground or below ground storage. Masters stated that it could be a structure with pumps and controls.

Esseks wondered if there are concerns about public hearing and input. Masters would encourage people to contact them and not necessarily wait for a public hearing. There will be public input as the projects are brought forward.

Esseks wondered if this plan approves specific sites. Masters replied that specific locations are not in this study. There are general locations. There is a need to acquire these properties before the properties are located in a Tier One area. Esseks asked if any of these facilities are located in Wilderness Park. Masters replied that there is one adjacent perhaps, but not in.

Sunderman asked what Tier III represents. Henrichsen replied that Tier III could be year 2055 in most cases.

#### Opposition:

**1. Mike Carlin is on the Board of Directors for Friends of Wilderness Park.** He submitted a letter from the organization. He has a fair amount of experience in contract management. There is a lack of cost benefit analysis. An independent study is included in the plan as an appendix. This report contains statements that seem to directly contradict the plan. He is concerned that in Chapter 7, cost estimates are provided but presented without adequate explanation of how they were determined. The plan does note that the anticipated accuracy is generally plus 50 percent to minus 30 percent. He asks for a more definitive explanation of how they were determined.

Esseks asked what would be gained from a more elaborate analysis as opposed to the cost effective analysis that was provided. Carlin replied that the gain would be a better idea of what we will be spending money on in the future. The 50 percent/30 percent

variable is quite the range. He thinks it can be scaled in a little bit so the alternatives are better defined.

2. **Lynn Moorer**, 404 S. 27<sup>th</sup> Street, urged Planning Commission not to recommend adoption of the Wastewater Facilities Master Plan update. She submitted a letter in opposition.

Esseks asked Moorer if she could direct him to the City Council minutes referencing cost benefit analysis. He can't find a reference to cost benefit analysis. He would like someone to point it out for him. Moorer noted that Svoboda and Newman both mentioned it.

Staff response and questions:

Esseks believes that a full cost benefit analysis should have been done if it was so stated by the City Council. Henrichsen replied that there were differing opinions in the discussion by City Council. The approved Resolution from City Council talks about a study. The \$500,000.00 was removed to acquire a site and it was changed to a study. Public Works has done an alternative analysis. It is part of a Wastewater Master Plan. A lot of considerations went into the plan. The conclusion was to use storage. He doesn't see what would be gained by spending additional time and funds to probably come to the same conclusion.

Masters commented that they met with Friends of Wilderness Park some time back and talked about many of these same points. He reviewed what was in the plan including their concern about the way Lincoln grows and plans its future. He emphasized that they did not contract with Corolla to do a cost benefit analysis. They asked for their judgement as a company that does nationwide business on water and wastewater engineering. A comment was made that the accuracy of cost estimates was 50 percent/30 percent and that this is not acceptable. He can point to a variety of projects following the range of those costs. An example is the anaerobic digesters on Theresa Street. Public Works was reluctant to accept the bid that they did because the actual cost was 60 percent higher than the estimate. He believes that the costs they use are inline and reasonable.

Henrichsen addressed the amendment to eliminate appendix N. The first appendix A is from 1958. A southwest treatment plan is not recommended. It does note a site by the Nebraska State Penitentiary that would be good for a storage facility. There is a lot of useful information. He sees the appendices as background references.

**ACTION BY PLANNING COMMISSION:**

February 27, 2008

Cornelius moved approval as revised by staff, seconded by Sunderman.

Cornelius stated that he has heard testimony that a cost benefit analysis might or might not be useful. As he understands the report's usefulness, it talks about four different



approaches to wastewater treatment in Lincoln. It may or may not be appropriate to look at a cost benefit analysis.

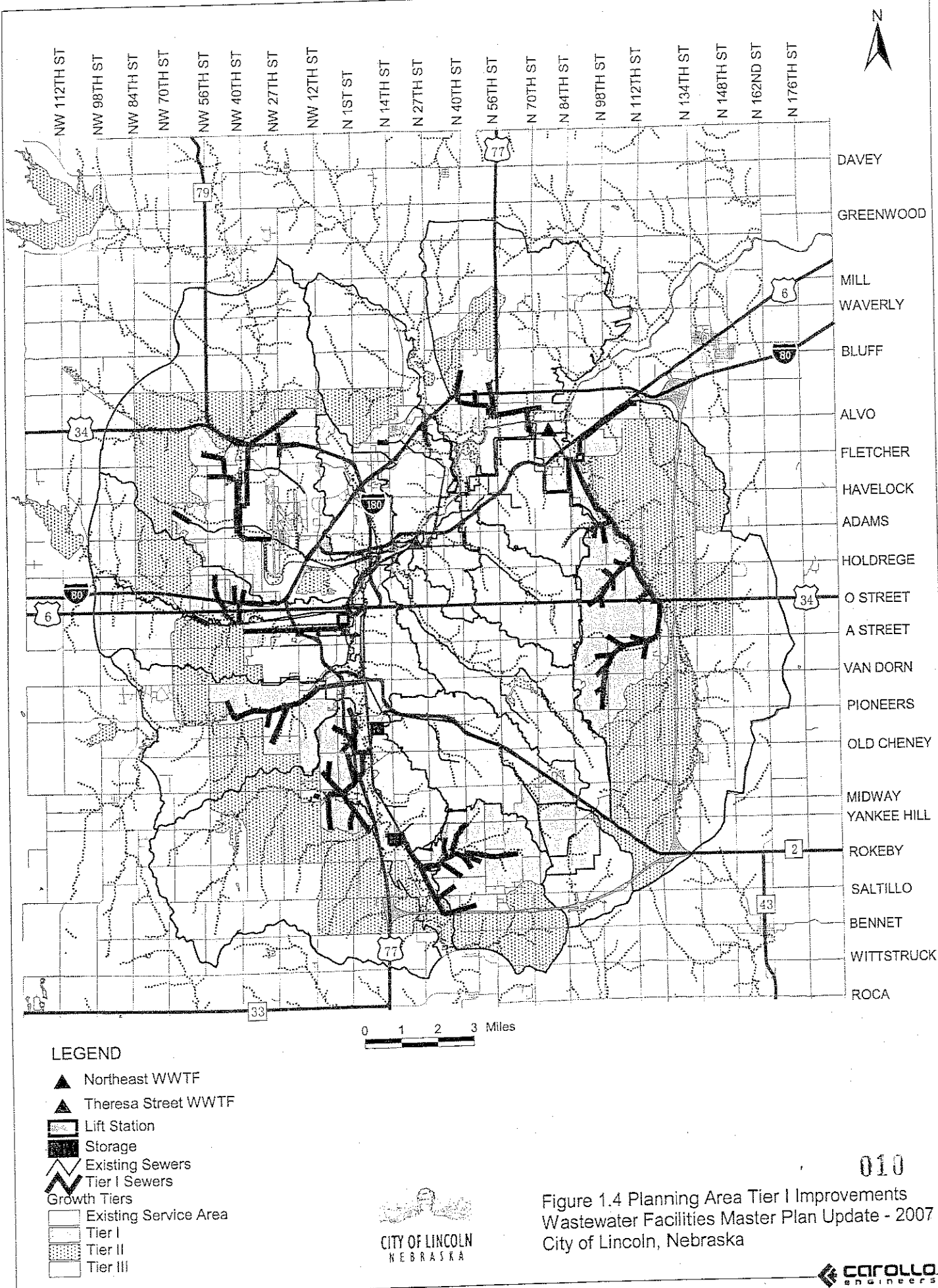
Esseks is not sure the cost benefit analysis was a mandate, simply just advice. He thinks that perhaps for land to be purchased so far into the future, monetary benefits would be difficult. Re-reading the documents we have, there seems to be enough evidence to say this is a useful study. He likes the idea of recommending storage.

Gaylor-Baird believes that by doing this so far in the future allows plenty of public notice as to where anything will be located.

Taylor thinks it is important that we continue to encourage discussion from people in the vicinity of Wilderness Park.

Carroll noted that this puts the Master Plan as an approved study into the Comprehensive Plan. He thinks the plan has followed what it is supposed to do.

Motion for approval as amended carried 7-0: Gaylor-Baird, Carroll, Cornelius, Esseks, Francis, Sunderman and Taylor voting 'yes'; Larson and Moline absent. This is a recommendation to the City Council and Lancaster County Board.



February 7, 2008

Mr. Dick Essex  
Lincoln Lancaster Planning Commission

RE: Wastewater Facilities Master Plan – Question on Cost Benefit Analysis

Dear Mr. Essex:

Thank you for your comments and questions at the briefing provided for the Planning Commission on January 30, 2008. A portion of the discussion did include that interests had been previously brought by the public in having a cost benefit analysis conducted on the facility alternatives for Southwest Lincoln. Recall that the Plan's analysis of four alternatives for Tier III development (potentially 50+ years from now) included:

- a Southwest treatment plant;
- new pipeline along the west side of Salt Creek;
- new pipeline on east side, near two existing sewer lines, adjacent to Wilderness Park; and
- a new option, peak storage.

The Wastewater Master Plan recommends additional peak storage as the preferred alternative. Our analysis found that peak storage was the least costly and was probably the least difficult to construct and permit. We also believe that adding storage would have the least potential for any impact on Wilderness Park of the four alternatives. The storage facility would hold peak flows to later be released into the trunk sewers. Wastewater conveyed through the trunk sewers from Southwest Lincoln will be treated at the Theresa Street Wastewater Treatment Facility.

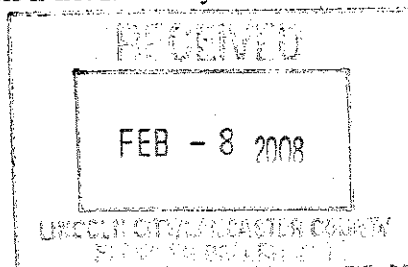
We believe that significant benefit exists in not disturbing park land and developed land. Both of the alternatives involving new trunk line construction would require significant costs and time to design, obtain right-of-way and to build pipeline projects. Given the recommended alternative, and the fact that the need for this alternative is potentially 50 years away, it is felt that the additional detailed study is not necessary. The storage alternative manages peak flows with the least adverse impact of the four options effecting both the natural and built environment.

The Master Plan seeks to identify detailed system needs beyond the Tier II area of the Comprehensive Plan. The Study makes use of computer modeling methods that were not available previously. To date, approximately \$465,000 and over 18 months of work have been committed for this review. The work concluded to date effectively identifies the infrastructure needed to serve future Lincoln. In light of the analysis to date and the merits of storage, it is felt that further analysis is not necessary at this time.

Sincerely,



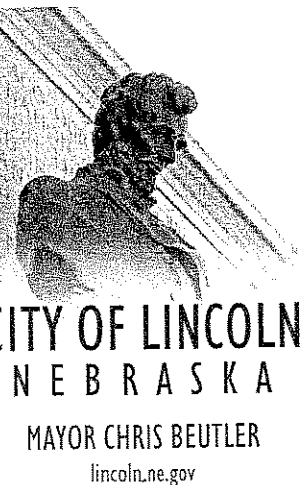
Steve Masters  
Public Utilities Administrator



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cc: Planning Commission, Marvin Krout, Steve Henrichsen, Greg MacLean, Trish Owen

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## MEMORANDUM

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TO: Planning Commission

FROM: Steve Masters, Public Works & Utilities *Steve Masters*  
Steve Henrichsen, Planning *SH*

SUBJECT: Clarification Amendment to Wastewater Facilities Master Plan

DATE: February 27, 2008

COPIES: Greg MacLean, Director of Public Works & Utilities  
Marvin Krout, Planning Director  
Trish Owen, Mayor's Office

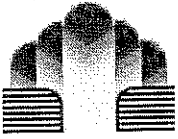
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The draft Wastewater Facilities Master Plan includes an analysis of four alternatives for the collection and treatment of wastewater from Tier I, II and III growth areas in southwest and south Lincoln. The analysis for Tier III development is included in Chapter 24, "Wastewater Treatment Facilities Future Improvements" and is summarized in the Executive Summary. The plan concludes that Alternative 4, Increased Storage, is the preferred alternative. This option was preferred over the other alternatives of building a new trunk line or building a new southwest treatment plant.

All subsequent maps, tables, charts and cost calculations are based on this alternative. Staff also has noted in all presentations that Alternative 4 was the preferred alternative selected for the Master Plan. However, it has been pointed out that the text in the Master Plan could be interpreted by some as not strong enough in stating the preferred alternative.

Thus, staff offers the following clarifying amendment to the Planning Commission for page 1-20 of the Executive Summary, page 24 -17 "Wastewater Treatment Facilities Future Improvements" and other appropriate locations:

"For the purposes of planning, a cost of \$416,000,000 from Alternative 4 was included in the Tier III Theresa Street WWTF improvements. Alternative 4, "Increased Storage" is the preferred alternative and is the basis for all improvements and calculations of the Wastewater Master Plan. The costs for this alternative are spread over a 20 year period starting in the year 2055.



Jean L Preister/Notes

02/26/2008 09:52 AM

To

cc Marvin S Krout/Notes@Notes, Stephen S  
Henrichsen/Notes@Notes

bcc Jean L Preister/Notes

Subject Item No. 4.3: Comp Plan Amendment No. 08001:  
Wastewater Facilities Master Plan: Public Hearing 2/27/08

----- Forwarded by Steve Masters/Notes on 02/26/2008 09:44 AM -----



Peter Dowben  
<PDOWBEN@UNL.EDU>

02/19/2008 02:02 PM

To SMasters@ci.lincoln.ne.us

cc "Prof. Jennifer Brand" <jbrand@UNL.EDU>

Subject Re: Facilities Study

Dear Steve -

In looking over the study, I have to say that while this report is not what one would consider a true cost-benefit analysis, this present report is a much more serious effort [than the prior report]. Given the limited amount of time available to you in preparing the report, it does look very much like a good faith effort at assessing the waste water situation.

My suggestion for improving the report, in addition to more details on the estimates, would be to include operation and maintenance. Personally, I think this is essential. These are part of your overall costs and should be factored in in any review of the alternatives. Building costs alone do not represent the true cost to Public Works or the city.

A critical need can be inferred from the report: the city of Lincoln needs to zone and reserve locations for utility corridors. Such lands could be city parks or reserved drainage basins, but an interlocking network of utility corridors is essential for future infrastructure development. This requires long term city planning and should be taken seriously. Building on existing land corridors needed for utilities and drainage is going to cause great problems [if those problems are not already being realized], and engineering solutions will be vastly more expensive than need be. In this regard, I can only guess at the problems Public Works now faces due constrained utility corridors. Going into the future, planning for stage III development, in terms of the utility corridors, has to begin now; not when the city gets to tier I or tier II.

These several issues are apparent [to me] as I mentioned to you, and are probably obvious to anyone who looks at your report. The other material you request will follow in a day or two....

Best regards,

peter

Peter Dowben, Ph.D., C. Phys., F. Inst. P.  
Charles Bessey Professor of Physics  
Research Professor of Chemistry

Department of Physics and Astronomy  
Nebraska Center for Materials and Nanoscience  
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e mail: [pdowben@unl.edu](mailto:pdowben@unl.edu)

<http://physics.unl.edu/directory/dowben/dowben.shtml>

February 20, 2008

City of Lincoln/Lancaster County Planning Commission  
555 South 10th, Room 213  
Lincoln, NE 68508

Commissioners,

This letter is in reference to the draft Wastewater Facility Master Plan (WWFMP) for which you will hold a public hearing on February 27, 2008. In August 2006 and again in August 2007, the City Council directed Public Works to conduct a comprehensive, unbiased study of sewage management options for the entire city to include, among several features, a cost-benefit analysis for each option and an explicit determination whether or not a third sewage treatment plant was needed.

There are five elements of the draft plan that The Friends of Wilderness Park believe need to be addressed:

1. The draft WWFMP does not include a cost-benefit analysis. As a result, a crucial tool for decision-making by public officials – a tool which the City Council directed should be included – is missing from the draft WWFMP. (Please refer to the attached report by F. Gregory Hayden, Ph.D., Department of Economics, University of Nebraska-Lincoln.) The absence of cost-benefit analysis renders all recommendations in the plan highly dubious.

2. All costs for the entire life of each project or improvement have not been included. In addition to money paid for planning, design, and construction, cost calculations should also include cost of land, operational, maintenance, damage and restoration, replacement, and disposal costs. (See Dr. Hayden's report.) However, none of these latter costs is included. The missing costs are critical for conducting planning, financial projections, and cost-benefit analysis.

For example, in Chapter 7, Economic Evaluation, if operation and maintenance costs of a new, additional sewage treatment facility would be factored in, the costs for a new SWWWTF would most likely be much higher in the Table 1.6 list of alternatives, Chapter 1. The failure to include all costs for the entire life of each project or improvement in the WWFMP greatly undermines the reasonableness and credibility of the recommendations in the plan.

3. Wastewater treatment facility (WWTF) planning costs, Chapter 7, Table 7.2 (replicated in Chapter 24, Table 24.2): In this table, the estimated unit cost to build a new WWTF is listed as \$12.50/gallon and the estimated unit cost to expand an existing WWTF is listed as \$8.00/gallon. Issues of concern include:

- No explanation of how the \$12.50 and \$8.00 figures were derived is provided. It seems reasonable to expect that the cost of building a new facility would be much higher than the cost of expanding an existing facility, possibly more than these figures indicate. Since these figures are the cornerstone upon which the planning estimates that follow are based, a detailed explanation of how they were determined should be provided before they are accepted.
- The anticipated accuracy of the order-of-magnitude cost estimates range from plus 50% to minus 30%. This means that the estimated \$12.50/gallon cost of building a new WWTF could actually be as high as \$18.75/gallon and the estimated \$8.00/gallon cost of expanding an existing WWTF could actually be as low as \$5.60/gallon. Thus, an extremely wide variability in costs is presented, which further undermines their usefulness.

4. Summary of Tier III Improvements, Chapter 24, Section 24.2.6: During the January 29, 2008 Public Open House and the January 30, 2008 staff briefing to the Planning Commission, City staff clearly stated that Alternative 4, Increased Storage, was the recommended alternative. By contrast, the actual wording in the WWFMP states that the figures from Alternative 4 were used "for the purpose of planning" and there is no written recommendation. If the WWFMP does, in fact, support the statements made by City staff, a clear recommendation of Alternative 4 should be explicitly stated in the WWFMP matching the public statements made by City staff.

5. Appendix N, Southwest Wastewater Siting Study Report (SWWWSSR): The City Council directed that the comprehensive study of sewage management options be conducted free of any bias. However, the SWWWSSR contains statements that recommend constructing a new sewage plant. These statements directly contradict statements and recommendations contained in the WWFMP.

The SWWWSSR is premised on the notion that a new sewage plant and associated facilities should be constructed in southwest Lincoln. The SWWWSSR recommends a specific site in southwest Lincoln and urges that steps be taken now to secure that site. By contrast, the WWFMP states that the four alternatives identified for Tier III (which include a new southwest treatment plant as one of the alternatives) represent "equal" solutions" and claims that the costs for all four alternatives are "nearly equal". As noted above, the WWFMP does not explicitly state that one of the four alternatives is recommended above the others. Nor does it explicitly state that any of the alternatives should be ruled out.

Thus, besides failing to make an explicit and specific recommendation regarding Tier III improvements, the WWFMP does not determine explicitly whether or not a third sewage treatment plant is needed, despite the City Council's directive. Moreover, inclusion of the SWWWSSR in the WWFMP injects a bias which the City Council explicitly prohibited.

These failures in the WWFMP taint its usefulness and confuse. They will become even more confusing and potentially contentious in the years to come if the long-range recommendations of the WWFMP are attempted. Presented as an Appendix to the WWFMP, the SWWWSSR is anointed with a degree of implied acceptance and concurrence that it clearly does not warrant. The SWWWSSR should be removed as an Appendix to the WWFMP. If it is used at all, it should be as a stand-alone document, not as a part of the WWFMP.

The Friends of Wilderness Park recommend that these issues be thoroughly addressed and adequately resolved before the Planning Commission forwards the draft WWFMP to the City Council for consideration.

Sincerely,

Mary Roseberry-Brown  
President, Friends of Wilderness Park  
1423 F Street  
Lincoln, NE 68508

Attachment (1)

cc: Lincoln City Council  
Mayor Beutler

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# The Carollo "Update of Wastewater Facilities Master Plan" for Lincoln, Nebraska Does Not Contain Cost-Benefit Analysis

by

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February 18, 2008

## Overview

The purpose of this report is to respond to a request by Friends of Wilderness Park for the author to review the Carollo "Update of Wastewater Facilities Master Plan" (WFMP) for the City of Lincoln, Nebraska (Carollo 2007) to determine whether the WFMP includes a competent cost-benefit analysis. The conclusion of the review is that the WFMP document has no indication of any attention to cost-benefit analysis and no database prepared that others could utilize to complete a cost-benefit analysis.

Cost-benefit analysis is a formal technique used in the economic analysis of government programs and projects to determine whether economic investment is justified. It is an economic concept, not a financial one. This review of the WFMP is based on standard cost-benefit (often referred to as benefit-cost) analysis (see Boardman, et al., 1996), examples of which are readily available in economic literature, applied project evaluations, and government documents.

The lack of cost-benefit analysis in the WFMP is consistent with the objectives and goals stated in the WFMP. As stated in two different places in the WFMP, the goals and objectives statement is as follows:

The overall goal of the Wastewater Facilities Master Plan Update is to determine and verify the capacity of the existing facilities and identify collection and treatment system modifications that are required to:

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1. Provide efficient wastewater collection and treatment service for existing as well as future users in the City of Lincoln.
2. Provide for continued protection of public health and the environment.
3. Comply with relevant local, State, and Federal operating permits, regulations, and other requirements.
4. Continue growth and development policies of providing gravity sanitary sewer service in drainage basins (Carollo 2007, pp. 1-1 and 2-3).

The WFMP reflects those concerns, not cost-benefit analysis. Additionally, there is no indication that the list of related “studies, reports, memorandums, improvement plans, and other documents” that Carollo “used, referenced and incorporated” into the WFMP included cost-benefit analysis (Carollo 2007, pp. 2-3 through 2-5). Furthermore, a review of summary statements in the WFMP finds nothing about cost-benefit analysis.

#### **Lack of Cost-Benefit Summary in the WFMP**

The summary of a cost-benefit analysis is to present the key assumptions and results of the basic evaluation.

That summary should include information on the net present value of benefits and costs and the stream of benefits and costs for all cases that the analysis examines in detail. It should also highlight key factors that have been quantified as well as those that have not. Finally, the summary should identify incremental net benefits from selecting different alternatives (Arrow, et al., p. 10).

No such summary exists in the WFMP, nor was any attention given to calculating a stream of benefits and costs, incremental net benefits, and/or the use of cost-benefit analysis to compare alternatives.

The WFMP states at the beginning of chapter 7 that economic evaluation is important (p. 7-1) and states in the summary of chapter 7 that a summary of recommendations from the evaluation is at the end of chapters 10 through 24 (p. 7-2). Yet, that is not the case. They contain neither the results of economic evaluation nor a summary of such evaluation. The summaries include pipe capacity and flows (p. 11-11), planning costs (pp. 10-29, 11-10 through

11-12, 12-8, 13-8, 14-9, 15-10, 16-21, 17-22, 18-10, 20-12, 21-18, 22-7, and 24-28); flow diversion (p. 19-12); and flows from trunk lines (pp. 23-11 and 23-12). The summaries deal with only some of the expected costs of recommended improvements, not value flows of net benefits (benefits minus costs) or the conversion of annual net benefit flows to net present value.

Likewise, in these summaries, the WFMP deals with unit prices of described physical improvements and treatments in a manner that is isolated from any economic evaluation. Even for unit prices, the WFMP states, "It is recommended that more detailed engineering and planning studies be completed to further . . . refine the estimated costs as capacity, regulations, or other requirements dictate" (p. 24-25). Thus, the costs reported in the WFMP are not even complete for its own purposes.

More importantly, the costs reported are not calculated to provide the kind of costs that public officials need to make decisions. Similarly, the costs summarized in chapter 26 of the WFMP (see pp. 26-1 through 26-3, and Table 26.3) do not include the kind of costs necessary to complete a cost-benefit analysis because major costs involved are not included, discussed further below. Furthermore, according to the WFMP, the limited costs included will need to be "confirmed based on more detailed engineering and design as projects are developed" (p. 26-1).

The WFMP statements that costs are to be determined after project decisions are made elucidates a serious problem in the report. The report assumes that decisions should be made prior to cost analysis rather than providing cost analysis (and cost-benefit analysis) for public officials to use to make project decisions.

In the "Southwest Wastewater Facility Siting Study Report" in Appendix N, the WFMP presents a summary list of purported "relative merits" (pp. 1-2). Officials should expect that each item in the list on page two to have been tested with cost-benefit analysis to know whether

each item is meritorious. That was not completed. In the same report, the WFMP states that "on its negative side" the East site "does have floodplain and wetland issues that will need to be addressed through site development activities" (p. 1). Such a statement is premature. It is not possible to conclude that the floodplain and wetland issues should be addressed through site development activities until such activities for the floodplain and wetland meet the criteria of cost-benefit analysis. Such analysis of the floodplain and wetland is not included in the WFMP.

The "Southwest Wastewater Facility Siting Study Report" also states that there may be "environmental issues" associated with the East site and that the site "should be investigated through geotechnical and environmental testing and evaluation" (p. 1). The results of geotechnical and environmental testing should have been designed to provide a database needed by cost-benefit evaluation. It was not. Without a testing design consistent with the needs of economic analysis, the testing will not provide relevant information for public decision makers. In the final summary paragraph, the WFMP claims that the East site appears to be the most "economical site" (p. 2). That statement is without foundation because an economic analysis was not completed.

### **Net Present Value and the Discount Rate**

Central to cost-benefit analysis is net present value. The idea of the net present value concept is that the value of a benefit or cost today is different than a benefit or cost of the same value tomorrow.

The standard criterion for deciding whether a government program can be justified on economic principles is *net present value* - - the discounted monetized value of expected net benefits (i.e., benefits minus costs): Net present value is computed by assigning monetary values to benefits and costs, discounting future benefits and costs using an appropriate discount rate, and subtracting the sum total of discounted costs from the sum total of discounted benefits. Discounting benefits and costs transforms gains and issues occurring in different time periods to a common unit of measurement (U.S. OMB 2000, p. 3).

The use of the discount rate to determine net present value is utilized both to account for economic efficiency and intergenerational equity, as it discounts future benefits and costs. "This discounting reflects the time value of money. Benefits and costs are worth more if they are experienced sooner" (U.S OMB 2002, p. 7).

However, there is no discussion or use of net present value in the WFMP. Likewise, the site selection criteria list (p. 11) and explanation (pp. 11-15) in Appendix N does not contain any cost-benefit criteria.

### **Net Benefits**

As stated above, the main part of cost-benefit analysis is to be devoted to net benefits which are benefits minus costs. That calculation is completely excluded from the WFMP report. The identification and measurement of net benefits should include comprehensive estimates of the expected benefits and costs to society, and not the benefits and costs to the government (see U.S. OMB 2000, p. 5). The WFMP does not take into consideration the benefits and costs to society. An implicit assumption in the WFMP appears to be that estimating government expenditures is equivalent to economic analysis. This assumption is not justified.

### **Life-Cycle Costs Should Include All Costs**

Numerous crucial costs are missing in the cost data of the WFMP in terms of being able to conduct planning, financial projections, and cost-benefit analysis. All costs for the life cycle of projects should be included, not just explicit money paid for planning, design, and construction of the project. The concept of opportunity cost is used in cost-benefit analysis in order "to place a dollar value on the inputs required to implement policies. *The opportunity cost of using an input to implement a policy is its value in its best alternative use.* Opportunity cost

measures the value of what society must forgo to use the input to implement the policy” (Boardman, et al., 1996, p. 31).

In addition to the cost of land for the site, cost calculations should include operational, maintenance, damage and restoration, replacement, and disposal costs. These costs are not included in the WFMP.

“Both intangible and tangible benefits and costs should be recognized. The relevant cost concept is broader than private-sector production and compliance costs or government cash expenditures” (U.S. OMB 2000, p. 5). An imputed purchase price for an asset such as a land site that is already owned by the government “or which has been acquired by donation or condemnation should be based on the fair market value of similar properties that have been traded on commercial markets in the same or similar localities” (U.S. OMB 2000, p. 15).

Without calculations of the wide range of societal and imputed costs, cost-benefit analysis is not possible. Nor is it possible to make informed government investment decisions about the project without such information.

#### **Concluding Remark**

The path, technical knowledge, and programs for cost-benefit analysis of physical projects and site selection are the most developed of all government investment decision making because cost-benefit analysis developed first in those areas in the 1930s and has continued to develop through widespread application and theoretical extensions. There is a well developed literature base, a plethora of examples, and an extensive infrastructure of technical expertise upon which Carollo could have drawn.

### *References*

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- Boardman, Anthony E., David H. Greenberg, Aidan R. Vining and David L. Weimer. *Cost-Benefit Analysis: Concepts and Practice*. Upper Saddle River, NJ: Prentice Hall, 1996.
- Carollo. "Updated Wastewater Facilities Management Plan." Lincoln: City of Lincoln, Nebraska, November 2007.
- United States Office of Management and Budget. "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs." Circular A-94. Washington, D.C.: Office of Management and Budget, 2000.

**LYNN E. MOORER**

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27 February 2008

Lincoln City / Lancaster County Planning Commission  
555 S. 10<sup>th</sup> Street  
Lincoln, NE 68508

Re: Proposed Wastewater Facility Master Plan update

Dear Members of the Board:

I urge you **not** to recommend adoption of the proposed Wastewater Facilities Master Plan update.

In 2006, the City Council received information indicating that many municipalities are moving toward centralized or regional sewage management systems. These cities are finding it safer and more cost efficient to centralize their sewage systems.

In response, the City Council appropriated \$500,000 in August 2006 for a comprehensive, unbiased sewage study, including cost-benefit analysis, to analyze options for the entire city. In seeking to obtain information regarding the costs and benefits of a variety of sewage management options and whether Lincoln should go with one treatment plant or more than one, the City Council commissioned a far more rigorous study than what Public Works has generated for previous Wastewater Master Plans.

When a year later, in August 2007, Public Works had still not completed this study and instead asked for money that worked at cross purposes to its mandate, the City Council reaffirmed its 2006 directive and declined to appropriate the requested new money.

The Public Works Director recently stated that the proposed Master Plan update "tak[es] care of" the City Council's directive for a comprehensive, unbiased sewage study. Unfortunately, the proposed update does **not** actually do what the City Council said it should do. Moreover, the proposed update is technically deficient in many respects.

A central problem is that cost-benefit analysis is completely missing. That's according to Dr. Gregory Hayden, a professor of economics at UN-L and an expert in



environmental economics. Nor does it devote any attention to compiling a database that others could use to complete a cost-benefit analysis.

Dr. Hayden noted (in a report attached to this letter) that cost-benefit analysis is a widely-used and well-developed formal technique used in economic analysis of government programs and projects to determine whether economic investment is justified. There are numerous examples of cost-benefit analysis that are readily available, according to Dr. Hayden, that could have been used as technical foundation for carrying out the City Council's directive.

Dr. Hayden stated that while the proposed update states that economic evaluation is important, the update does not, in reality, contain the results of genuine economic evaluation.

Most importantly, the costs reported are not calculated to provide the kind of costs that public officials need to make informed decisions, according to Dr. Hayden.

Major, crucial costs are missing. All costs for the life cycle of the projects should be included, not just money paid out for planning, design, and construction, Dr. Hayden said. However, the update did not include any of the following costs that should also be included: costs for land, operations, maintenance, damage and restoration, replacement, and disposal costs.

In addition, the proposed update pays no attention to a concept that is central to cost-benefit analysis: net present value. The idea of net present value is that the value of a benefit or cost today is different than a benefit or cost of the same value tomorrow.

The main part of cost-benefit analysis is supposed to be devoted to net benefits, that is, benefits minus costs. This is completely excluded from the proposed update.

Dr. Hayden noted that the update uses an unjustified assumption: that simply estimating government expenditures is equivalent to economic analysis.

In conclusion, Dr. Hayden's expert analysis demonstrated at least three things: First, the proposed update did not conduct cost-benefit analysis before generating any of its recommendations regarding infrastructure improvements. Second, the proposed update does not carry out the City Council's 2006 mandate that cost-benefit analysis should be undertaken as a part of a comprehensive, unbiased sewage study for the City of Lincoln. Third, the proposed update does not even report the kind of costs that you Planning Commissioners, the City Council members, or other public officials need to make decisions.

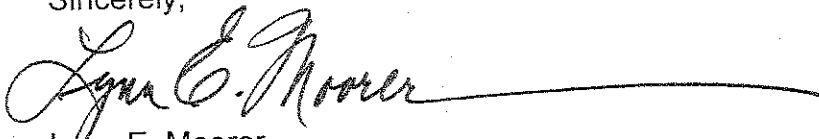
To proceed, even for planning purposes, without considering, at a minimum, all life cycle costs would constitute a monumental accounting mistake for the city.

Moreover, Public Works needs to produce a study that fully meets the City Council's mandate. Lincoln cannot manage its sewage issues, which are becoming more and more complex, or plan adequately without competent cost-benefit analysis and examination of forward-looking technologies like other cities are doing. Without this, Lincoln and its citizens will soon find themselves at a significant disadvantage and, possibly, at risk from a public health, safety, or environmental perspective.

I wish I could support adoption of this update, but it's not possible. It does not contain the information and analysis that the City Council directed and the taxpayers and residents of Lincoln need.

Thank you for your careful consideration of this matter.

Sincerely,



Lynn E. Moorer

Attachment (1)